

## *The Many Faces of Methamphetamine: Addiction, The Family and The Community*



Cardwell C. Nuckols, PhD  
cnuckols@elitecorp.org

## HIV

"Crystal meth use is the newest and most important threat to the HIV epidemic in the United States."

Dr. James Dilley  
University of California  
AIDS Health Project

## High Rates of Trauma

- 44% of women and 24% of men entering treatment for methamphetamine addiction report childhood sexual abuse
- 32% of women and 34% of men report childhood physical abuse
- 56% reported parental alcohol and/or drug problems
- Multigenerational

Brown University, Institute of Addiction Theory and Education, May 2004

## Good News

- Early Life Developmental Trauma is treatable
- Multigenerational patterns of disorganized attachment can be broken
- Establishing a "helping" or therapeutic relationship is most important variable

## Bottom Line

**It's All About Food, Water  
and Sex!**

## The Rat Brain

- What "turns on" the dopamine in a rats brain.....
  - SEX-200% increase in dopamine
  - COCAINE-300% increase in dopamine
  - METHAMPHETAMINE-1100% increase in dopamine
- This explains why rats will kill themselves to get more drug-especially methamphetamine

## Frontal (Executive) Cortical Functions

- Focus attention
- Prioritize
- Exclude extraneous information
- Suppress primitive urges
- Reduce impulsivity



## Frontal Cortex (FC)

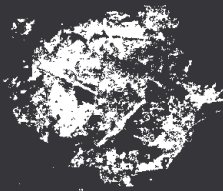
- Decisions like choosing immediate gratification (using methamphetamine to satisfy craving) vs. healthy choices are made in the FC.
- Addicts tend to make choices without regard for punishment or harm
- Habit and compulsion overrides recognition of harm associated with repeated error

## Non-Addict Response

- "This is dangerous"
- Prefrontal cortex
  - Sends inhibitory signals to the Ventral Tegmental Area (VTA)
  - Reduces dopamine release
- No repetitive methamphetamine use pattern
- No reinforcement of pleasure

## Addict Response Pattern

- "Got to have more"
- Cognitive Deficit Model
  - Abnormalities in prefrontal cortex
    - Compromised ability to send inhibitory signal to VTA
- Chronic alcoholics have reduced GABA
  - Neurochemical used in the inhibitory process
- Meth and Coke may damage this brain loop
  - Frontostriatal loop



## End Organ Toxicity

- Central Nervous System
- Cardiovascular System
- Pulmonary System
- Renal System
- Hepatic
- Fetal Development

## Central Nervous System

- Acute psychosis
- Chronic psychosis
- Strokes
- Seizures



## Cardiovascular System

- Myocardial Infarctions
- Arrhythmias
- Cardiomyopathy

## Pulmonary System

- Acute Pulmonary Congestion
- Chronic Obstructive Lung Disease



## Renal/Hepatic Failure

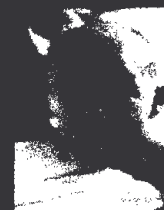
- Renal failure
- Hepatic Failure

## Fetal Development

- Exposure early in pregnancy
  - Fetal death
  - Small size for gestational period
- Exposure later in pregnancy
  - Learning Disabilities
  - Poor social adjustment

## Childhood Exposure

- 80% of children found in homes where methamphetamine is being manufactured are "high" positive for the drug. Some are babies over one year old.
  - Use of inhalant fumes
  - Direct contact with the drug
  - Second hand smoke
  - Direct ingestion



## Childhood Exposure

- Social workers now accompany law enforcement during lab seizures where children are involved.
- Allowing children to be in such an environment is considered neglect and/or child abuse.
- Parents may be charged with second-degree criminal mistreatment

## Childhood Exposure

- Children are uniquely susceptible because their brains are still developing (lead poisoning) and because they are very curious
- Children have greater skin surface area per pound



## Lab Seizure Locations

- Most common locations
  - Single family houses
  - Apartments
  - Mobile homes
  - Vehicles
  - Garages
  - Trailers
  - Motels/hotels
  - Businesses

## Stove Top Labs

- Cookers make small amounts using household equipment and chemicals
- The active ingredient
  - Ephedrine or pseudoephedrine
- Chemical ingredients
  - Trichloroethane (gun scrubber)
  - Ether (engine starter)
  - Methanol (gasoline additive)
  - Gasoline
  - Kerosene

## Stove Top Labs

- Chemical ingredients
  - Lithium (camera batteries)
  - Anhydrous ammonia (farm fertilizer)
  - Red phosphorus (matches)
  - Iodine (veterinarian product)
  - Muriatic acid
  - Campfire fuel
  - Paint thinner

## Stove Top Labs

- Chemical ingredients
  - Acetone
  - Sulfuric acid (drain cleaner)
  - Table salt/rock salt
  - Sodium hydroxide (lye)
  - Sodium metal (can be made from lye)
  - Alcohol (rubbing/gasoline additive)

## Household Equipment

- Coffee filters
- Rubber gloves
- Tempered glass baking dishes
- Glass or plastic jugs
- Bottles
- Measuring cups

## Household Equipment

- Funnels
- Blenders
- Hotplate
- Strainer
- Propane cylinder
- Aluminum foil

## Toxicity

- For every unit of methamphetamine manufactured, there exists 5 times that amount in toxic waste
- This waste is dumped in streams, sewers, fields
- Environment is contaminated especially groundwater

## Toxicity

- Toxic gases permeate the walls and carpets making homes and buildings uninhabitable.
- The cost to the taxpayer to clean these sites is between \$2000 and \$4000.
- Sometimes these gases explode and cause fires.

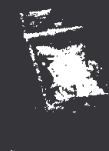
## Tolerance

- Brain cells gradually become less responsive
  - More is needed to stimulate the VTA brain cells
  - To cause more release of dopamine in the NAc
  - To produce reward comparable to earlier experiences



## Stimulant Toxicity

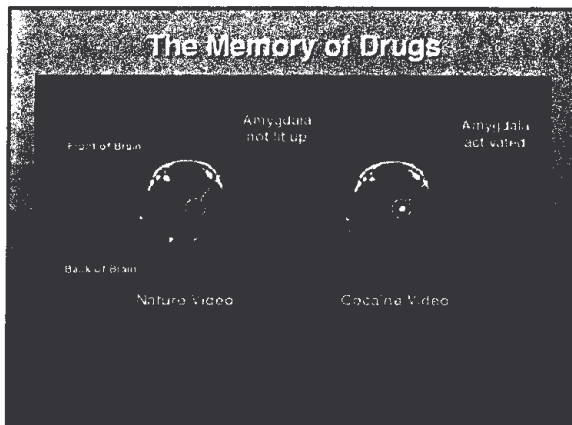
- Increased levels of Norepinephrine and Dopamine
  - Hyper-arousal
  - Pleasure
  - Paranoia
- Increased levels of Serotonin
  - Reduced hunger
  - Difficulty sleeping



## Stimulant Crash

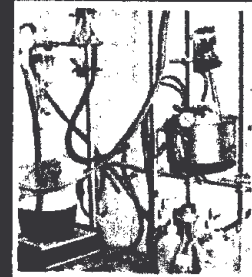
- Reduced levels of Norepinephrine and Dopamine
  - Dysphoria
  - Depression
  - Anhedonia
- Reduced levels of Serotonin
  - Mood swings
  - Sleep disturbances

- Situational triggers
  - Environment (People, Places And Things)
    - Initially drug causes release of dopamine
    - After addiction, situations that have a high probability of use cause dopamine release
- Emotional triggers
  - Internal (Hungry, Angry, Lonely, Tired, Reward and Bored)



## Most Common Craving Triggers

- In presence of
  - People and drugs
  - People and drug users
  - Places where used to use or purchase
- Negative feeling states particularly anger but also:
  - Boredom
  - Loneliness
  - Fear
  - Anxiety



## Most Common Craving Triggers

- Positive feeling states
- Physical pain
- Use of mood-altering prescription drugs
- Suddenly having a lot of cash
- Complacency
- Insomnia
- Sexual functioning

## Craving Management

- Psychotherapy
  - Behavior Therapy
    - Structure
      - Recovery Foundation Program
    - Changing patterns
    - Safety Plan
- Pharmacological
  - Acute
  - Maintenance

- Frontal cortex vs. midbrain
- Approximately 50% entering treatment suffer from cerebral (cognitive) dysfunction
  - Less likely to attend continuing care
  - Less likely to be employed
  - Often mistaken as resistant or unmotivated
  - Less able to absorb information
- Stimulant addicts look like they have degenerative brain disease

## Cognitive Dysfunction and Change

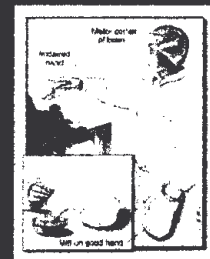
- Executive and visuospatial functioning problems include:
  - Recent memory
  - Abstraction
  - Problem solving
  - Cognitive flexibility
  - Planning
  - Rapid Response

## Cognitive Dysfunction-Stimulant Addicts

- Long term stimulant abuse causes damage to dopamine producing cells and leads to reduced levels
- Stimulant addicts may suffer from poor attention and compromised fine motor skills

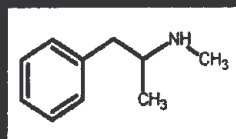
## Cognitive Dysfunction and Change

- Recovery in neuropsychological functioning
  - Most of treatment is during time of prefrontal dysfunction
  - Recovery is:
    - Time dependent
      - 12-18 months post-treatment
    - Exposure dependent
      - 12-18 months post-treatment



## Education

- Why give a methamphetamine addict a 60 minute didactic or video?
- A new format
  - 8-20 minute simple didactic
    - Pre-10 pre-treat in treatment
  - 10 minute quest format
  - 30 minute decision group



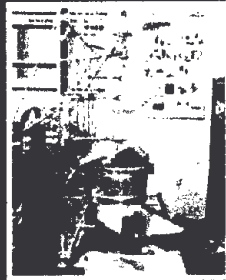
Methamphetamine (100%)  
 100% Methamphetamine (100%)

## Environment

Triggers or cues (seeing, smelling, touching, tasting, and hearing) that remind the addict of some aspect of his/her use increase the desire for the reward (craving) without necessarily enhancing the pleasure of the reward itself.

## Environment

- Living in an enriched environment may reduce animals self-administration of drugs
- Animal studies suggest that environmental conditions may affect the activity of dopamine



## Meth Hurts Moms and Kids

Researcher, Jennifer M. Gray, M.D., has founded Mothers Against Methamphetamine and the following:

"We're seeing fetal death. Infant mortality is high. The kids who are born aren't full. They're underweight. They're sick. They are going to have ADHD, asthma, diabetes, and they grow up in a home with an addicted mother who doesn't care about them."



## Environment

- Case Management
- Multisystem Therapy
- "Wrap around" services
  - Family and childcare services
  - Housing/Transportation services
  - Financial and legal services
  - AIDS and medical services
  - Addiction and mental health services
  - Vocational and educational services

## Spirituality

- 2 major reviews of the literature
  - National Institute for Healthcare Review (1996)
    - "Good or bad, the religious ethic is associated with improved outcomes in both inpatient and outpatient care."
  - NIAAA and Felzer Institute (1999)
    - "Strong support for the protective nature of spirituality and religion: 110 studies of involvement (61 studies) and spiritual/religious intervention (23 studies)."

## Spirituality In Addiction Recovery

Spirituality refers to the unique and intense experience of a reality greater than oneself or an experience of connection with the totality of things. Religion is an organized social structure in which spiritual experiences are shared, ritualized and passed on to future generations

## Spirituality In Addiction Recovery

An individual does not have to be religious in order to have a spiritual experience. The benefits of spirituality include humility, inner strength, sense of meaning and purpose in life, acceptance of self and others, sense of harmony and serenity, gratitude and forgiveness.



## Beliefs Of Our Clients

- Over 90% of Americans believe in God
- 57% engage in daily prayer
- 42% attended church in the last week
- 80% believed that religious faith can aid in recovery from illness

## Beliefs Of Our Clients

- 63% agreed that doctors should talk to them about spiritual issues (McNichol, 1996)



## Beliefs of Medical Professionals

- According to **Alcohol Medical Scholars Program, *Spirituality in Substance abuse/Dependence Treatment***, Marianne Guschwan, MD
  - Most psychiatrists do not believe in God
  - Nurses and medical students in one survey ranked spirituality as a low consideration of patients treated on a dual-disorder unit

## Beliefs of Medical Professionals

- Guschwan continued
  - However, the patients ranked spirituality and belief in God as most important to their recovery-Interesting incongruence!



## Alcoholics Anonymous

- Based on Judeo-Christian principles
- Mutual self-help program
- JCAHO mandates discussion of alternatives
  - Secular Organization for Sobriety (SOS)
  - Rational Recovery (RR)
  - Moderation Management (MM)

## Alcoholics Anonymous

- 2 year study of 2319 Alcohol-Dependent Men (McKellar 2003)
  - People who keep an active connection in AA are more likely to recover
  - Cause and effect-What came first AA or reduced drinking?
    - *insert AA*
  - Men who showed strong motivation at start were:
    - Less likely to remain in AA
    - More likely to have continued alcohol problems

## Summary of AA Research

- 243 studies of AA prior to the year 2001
  - When investigating treatment outcomes AA should not be ignored
  - Combination of AA and treatment predicts better outcomes
    - Same results found in UK
  - Continuous abstinence is most likely to be affected by AA

## Summary of AA Research

- AA without professional treatment does not *always* result in better outcomes
- Treatment based on 12-step approaches are as effective as other approaches and may actually achieve more sustained abstinence (10<sup>th</sup> Report to US Congress on Alcohol and Health, 2000)

## Summary of AA Research

- Project MATCH compared Twelve-Step Facilitation Therapy (TFT) with Cognitive Behavioral Therapy (CBT) and Motivational Enhancement Therapy (MET)
  - TFT group did at least as well and did better on measures of complete abstinence

## Summary of AA Research

- Practically speaking (Owens,2003)
  - AA attendance is associated with increased
    - Self-confidence &
    - Self-efficacy in regard to avoiding drinking
  - AA friendships and support are positively associate with reduction in alcohol and drug use
  - AA participation leads to lifestyle changes that lead to greater levels of abstinence

## Summary of AA Research

- Practically speaking (Owens,2003)
  - Support from AA members is more important for abstinence than support from non-members
  - Internalizing the program-not the number of meetings attended-is a positive factor in abstinence rates
- Remember no one program is for everyone

## REFERENCES

- Robinson, Terry E.  
**NEUROSCIENCE: Addicted Rats**  
Science 2004 305: 951-953
- <http://psychiatry.psych.org/publications/1999/2004/12276>
- American Medical News, July 26,2004,Mary Holley, M.D.